General Notes.

MINERALOGY AND PETROGRAPHY.[1]

Petrographical News.—An article full of interesting observations on the alteration of olivine and augite, is by Dorr,[2] who describes the minettes, kersantites and melaphyre dykes in the neighborhood of Dresden, in the Plaunischer Grund. The three rocks cut syenite, and the first two contain inclusions of it. The olivine of the minette is frequently twinned parallel to $P\breve{\infty}$. It has often changed into pilite and talc, and has, in some cases, been pseudomorphed by quartz. The augite has given rise to pseudomorphs of calcite and quartz, and has undergone alteration into biotite under the influence of dynamo-metamorphism. The biotite, some of which is primary, has been enlarged since the solidification of the rock. It is intergrown with orthoclase in some instances, and alters into chlorite and talc, with the addition of rutile in the minettes, and of anatase in the kersantite. The quartz inclusions in both rocks are surrounded by rims of green augite, while inclusions of orthoclase have altered on their edges to biotite when solution has not been completed. When the fusion has proceeded to completion, no evidence of the former existence of the inclusion is present. The paper is well illustrated, and it contains full literature of the most important points discussed.——Bonney[3] has made two traverses across the crystalline rocks of the Alps with the object of determining their age. In the course of his article on the subject he describes the microscopical character of the gneisses, mica-schists and clay slates found there. A mica-schist from the Octroi de Vizille consists of mica, cyanite and quartz. The cyanite occurs in irregular-shaped grains, containing tiny flakes of brown mica, black granules and minute belonites. Calci-mica-schists from the eastern side of the Cottian Alps are composed of granular quartz, calcite, and brown and white mica. These are supposed to have originated from sediments. The other rocks described present no peculiar features, except that they all exhibit the effects of crushing

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[2]*Miner. und Petrog. Mitth.*, XI., p. 16.

[3]*Quart. Jour. Geol. Soc.*, Feb., 1889, p. 67.

and re-cementing.——Analyses of phyllites, amphibolites, porphyroids, quartzites, and a few minerals from interesting localities in Belgium and the Ardennes, France, form the basis of an instructive article by Klement.[4]——Collins,[5] in an article on the nature and origin of clays, divides these into clays produced in situ by the alteration of feldspar, and derived clays. The former are purest, and include the china clays. Derived clays are impure, in consequence of the admixture of unaltered feldspar and other minerals. The composition of a pure clay is about as follows:

SiO_2	Al_2O_3	Fe_2O_3	Alk	MgO	CaO	Org. Mat	H_2O
47.82	41.43	.30	.39	.29	.11	.10	10.50

When washed, it contains no scaly or flaky particles, but possesses a uniform texture. Its composition corresponds very nearly to the formula $Al_2 (HO)_6 SiO_2 + Al_2O_3 3SiO_2$. In discussing the origin of clays, Collins states that the theory based upon the action of carbon dioxide on feldspar is untenable. He inclines to the von Buch and Daubrée view of the action of solutions containing salts of fluorine or fluosilicic acids.——Teall[6] has discovered long, acicular, colorless, rutile needles in several of the clays of England. This observation is interesting from the fact that Thurach was not able to find the mineral in the clays which he examined, although it is well known as a constituent in clay slates under the name "Thonschiefer-nädelchen."——Among some notes on a few rocks from the Salzburg and Tyrolese Alps, Cathrein[7] describes an eclogite in which the garnets are changing to hornblende. He also mentions an amphibolite in which are light-colored apparently prismatic crystals, which, under the microscope, are resolved into aggregates of epidote and zoisite. The author regards them as pseudomorphs of the former mineral after the latter. A second specimen of amphibolite contains garnets that are gradually changing into biotite. ——Mr. Merrill[8] describes in detail the peridotite[9] from Deer Island, Maine, in which augite enlargements have been discovered. The rock is a picrite, composed of olivine, augite and various iron oxides. The enlargement of the augite seems to have resulted in some way through the alteration of olivine, as the added material is found extending from

[4] *Bull. Mus. Soc. Roy. de Hist. Nat. de Belg.*, t. V., p. 59.

[5] *Miner. Mag.*, Dec., 1887, p. 205.

[6] *Min. Magazine*, 1887, Dec., p. 201.

[7] *Ver. d. K. K. geol. Reichs.*, No. 8, 1889.

[8] *Proc. U. S. Nat. Mus.*, 1888, p. 161.

[9] *Amer. Jour. Science*, May, 1887, p.

the augite only into the altered olivine, along what were probably the cleavage cracks of the fresh mineral.——A specimen of the variety of picrite known as scyelite was discovered by Bonney[10] in the island of Sark, British Channel. It consists of serpentinized olivine, altered augite, bleached mica, some of which exhibits a banded twinned structure, one set of bands extinguishing parallel to the cleavage of the mineral, and the second 18° from this. The rock was not found in place.——The separation of large quantities of apatite from the gneiss of Freiberg and the granite of the Kinzigthal has given Steltzner[11] the opportunity of comparing their composition. He found that the apatite from the gneiss corresponds to the formula $10Ca_3\ (PO_4)_2 + 3CaF_2$, while that from the granite accords better with the formula $13Ca_3\ (Po_4)_2 + 4CaF_2$.

Mineralogical News.—A number of yellow grains of monazite [(Ce, La, Di) PO_4] having been found in the sands from various localities in Brazil, more particularly in the neighborhood of Rio Janeiro and in the diamond fields, Mr. Derby[12] has sought for the mother rock containing the mineral, and has found it in the biotite-gneiss, granites and syenites of the region. His method of operation was to grind into powder a large quantity of the decomposed rock and wash it in the manner made use of in the search for alluvial gold. A full description of the mineral and the rocks in which it occurred is promised in due time.——Measurements of fifteen crystals of *polybasite* from five different localities afford Miers[13] data for the determination of the axial ratio of this mineral with some degree of accuracy. He finds it to be $a : b : c = 1.7262 : 1 : .6344$. Crystals with an apparently hexagonal habit are in reality twins, with the twinning plane ∞P. The examination of eighteen crystals of *aikinite* from Beresovsk, Urals, affirms the conclusion that the mineral is orthorhombic. The prismatic angle is 82° 22.——Among a few minerals from the Ardennes and Belgium analysed by Klement[14] attention may be called to a chromiferous *mica*, occurring in small flakes on vein quartz from Salin-Chateau, Belgium. The lamellæ are non-elastic, but their composition approaches that of muscovite, viz.:

Si_2O	Al_2O_3	Cr_2O_3	Fe_2O_3	CaO	MgO	K_2O	Na_2O	Li_2O	H_2O
45.68	34.17	.84	2.35	.27	3.84	4.47	2.23	tr	4.65

[10] *Geol. Mag.*, Mar., 1889, p. 109.

[11] *Neues Jahrb. für. Min.*, etc., 1889, I., p. 265.

[12] *Amer. Jour.*, *Sci.*, Feb. 1889, p. 109.

[13] *Miner. Magazine*, May, 1889, p. 204.

[14] *Bull. Mus. Roy. de Hist. Nat. de Belg.*, V., p. 59.

A manganiferous *chlorite* from Villsalen contains

SiO_2	Al_2O_3	Fe_2O_3	FeO	MnO	MgO	H_2O
27.13	24.70	5.84	9.72	1.98	20.52	11.35

——Upon comparing the loss of arsenic consequent upon the heating of *löllingite* and *arsenopyrite*, Loczka[15] concludes that the latter mineral is a compound of $FeAs_2 + FeS_2$, and that its decomposition by heat is effected as follows:

$$(1)\ FeS_2 + FeAs_2 = FeS + S + FeAs_2\,;\ (2)\ FeAs_2 + S = FeS + 2As.$$

——The mean of a lot of analyses of *pinite*[16] from the conglomerate of Boston yields.

SiO_2	Al_2O_3	Fe_2O_3	K_2O	Na_2O	CaO	MgO	H_2O	Loss
48.16	36.23		8.65	.39	.28	.91	4.51	.38

Meteorites.—Of very considerable interest to students of meteorites are two recent articles by Huntington. It will be remembered that this writer, in 1886, showed[17] that the Widmanstättian figures and Neumann lines on the etched surfaces of meteoric irons are sections of planes of crystalline growth parallel to the cube, dodecahedron and octahedron, which planes are also the planes of easiest cleavage for meteoric iron. In one of his recent papers[18] he shows that in the case of the Butcher meteroite (Coahuila, Mex.) the cleavage is parallel to the faces of an interpenetration cube. The surface produced by fracture of this meteor is very different from the fracture surface of the Saltillo iron, and therefore the two must be regarded as representing different falls. On the other hand, the similarity in structure between the Saltillo, the Allen County, Kentucky, the Chattooga, and Maverick County, Georgia, meteors, is so striking as to lead to the conclusion[19] that they must be parts of a single large body. In the last paper published by Huntington, the author declares that a single piece of the Coahuila iron presents the Widmanstättian or Neumann markings, or is amorphous, according to the portion of the mass from which the etched specimen is taken, and that, therefore, these markings cannot be depended upon as a means of classifying such meteorites. It is further shown that these markings, which have hitherto been regarded as characteristic of meteors, are present also on

[15] *Zeits. f. Kryst*, XV., p. 40.

[16] Crosby: *Technology Quarterly*, Feb. 1889, p. 248.

[17] Proc. Amer. Acad., 1886, XXI., p. 478.

[18] Ib., 1888, XXIV., p. 30.

[19] Ib., XXIV., p. 313.

etched surfaces of spiegeleisen.——Meunier[20] calls attention to the fact that we know almost nothing in regard to the nature of that constituent of certain meteorites which turns black upon being subjected to heat. He has been investigating the subject for many years, and now reports a few facts discovered by him with reference to the properties of the substance.——A meteoric iron found about the year 1880, on the top of the Alleghany Mountains, in Greenbriar County, West Virginia, weighs eleven pounds, has a specific gravity of 7.869, and contains cavities in which are masses of graphite. Upon treating a portion with hydrochloric acid, Fletcher[21] found fragments of chromite crystals in the insoluble residue. The composition is:

Fe	Ni	Co	Cu	P	S	Residue
91.59	7.11	.60	tr	.08	tr	.12

——The same author[22] gives an analysis of the Nejed iron, that fell in Central Arabia, in 1863. His figures are:

Fe	Ni	Co	Cu	P	S	Insol.	Sp. Gr.
91.04	7.40	.66	tr	.10	tr	.59	7.863.

——The tenth meteoric iron whose fall is authenticated by eye witnesses, has been described by Mr. G. F. Kunz.[23] It fell at Lamar, Johnson County, Arkansas, at 3.17 P. M., March 27th, 1886. The mass is in general flat and irregular in shape. It measures 17½ in. by 15½ in., and weighs 107½ pounds. Its analyses yielded: Fe = 91.87, Ni = 6.60, Co = tr, P = .41 C, S, etc., = .54.——A meteoric iron from La Bella Roca, a peak of the Sierra de San Francisco, Durango, Mexico, has been described by Whitfield[24] as containing little nodules of troilite. Those on the surface have been removed by weathering, leaving pits corresponding in size to the original nodules. ——In a very exhaustive chemical article upon the meteoric iron of S. Julião de Moreira, Portugal, E. Cohen[25] has given some valuable analyses of this meteor, as well as of its constituents. He gives also new analyses of the Scottsville, Allen County, Kentucky, iron, and of that of Fort Duncan, Maverick County, Texas.——A brecciated meteorite from the San Emigdio Mountains, California, is described by

[20] Bull. Soc. Franc. d. Min., 1889, XII., p. 76.

[21] *Min. Mag.*, Dec., 1887, p. 183.

[22] Ib., p. 187.

[23] Pro. U. S. Nat. Mus., X., p. 598.

[24] *Amer. Jour. Sci.*, June, 1889, p. 439.

[25] *Neues. Jahrb. f. Min.*, etc., 1889, I., p. 215.

Mr. Merrill[26] as consisting of olivine, iron, pyrrhotite, and minute fragments of a colorless, polysynthetically twinned mineral, probably of the pyroxene group, in an almost irresolvable fragmental ground mass. ——The Fayette County, Texas, meteorite[27] is interesting, because of the existence of a vein in it similar to the vein in the Ställdalen meteor described by Reusch.[28] The stone belongs to the chondrite group of Rose, with chondri composed of olivine or enstatite alone, or of both together. The vein consists of a black amorphous substance with a bronzy lustre, in which are scattered little blebs of iron and pyrrhotite, and a few colorless silicates. The composition of the mass of the stone is:

SiO_2	Fe	FeO	Al_2O_3	CaO	MnO	MgO	Ni.Co	S
37.70	4.41	23.82	2.17	2.20	.45	25.94	1.75	1.30

——To the large number of meteors already mentioned by many writers as having fallen in Chili, Sandberger[29] adds another. It consists of olivine, diopside, a little chromite and troilite as a fine-grained aggregate in which little flecks of metallic iron are imbedded. In this meteor were also found hydrocarbons and small grains of black carbon with a hardness over 9. These occur in the iron, and are, without doubt, forms of black diamond, similar to the substance lately found by Koksharow[30] in a Russian meteorite.——Mr. Eakins[31] gives the result of the analysis of a meteor obtained by Prof. Hill, of Texas. The stone is composed of olivine, enstatite, and probably a feldspar, besides five per cent. of troilite and a little chromite. Its specific gravity is 3.543, and composition:

SiO_2	Al_2O_3	Cr_2O_3	FeO	Fe	NiO	Ni	CaO	MgO	K_2O	Na_2O	S	Aq
44.75	2.72	.52	16.04	1.83	.52	.22	2.23	27.93	.13	1.13	1.83	.84

——Two new masses of meteoric iron have recently been described by Mr. Kunz.[32] The first weighs 428 grams. It was found on Linnville Mt., Burke Co., N. C. The second weighs 25.61 lbs., and was found in Laramie Co., Wyoming. Analyses of the two are as follows:

	Fe	Ni	Co	S	P	C
Linnville,	84.56	14.95	.33	.12	tr	tr
Laramie Co.,	91.57	8.31	tr		.07	tr

[26] Proc. U. S. Nat. Mus., 1888, p. 161. Cp. *Amer. Jour. Sci.*, 1888, p. 190.
[27] Whitfield and Merrill: *Amer. Jour. Sci.*, Aug., 1888, p. 113.
[28] *Neues. Jahrb. f. Min.*, etc., 1886, B. B. IV., p. 491.
[29] *Neues Jahrb. f. Min., etc.*, 1889, II., p. 173.
[30] *Mater. zur Min. Russl.*, X., p. 82.
[31] *Amer. Jour. Sci.*, 1889, p. 59.
[32] *Amer. Jour. Sci.*, Oct., 1888, p. 275.